T10D08 – 10.5-6 Halogenalkanes (S_N1 & S_N2)

Name …….

1. 10.5.1 Describe, using equations, the substitution reactions of halogenoalkanes with sodium hydroxide. (2)
   a. Describe the general properties of halogenalkanes:

   b. How does the electronegativity of halogens in halogenalkanes effect the compound?

   c. Illustrate, using partial charges, why halogenalkanes are susseptable to attack by nucleophiles:

   d. In the substitution of halogenalkanes, what are the elctrophile and nucleophiles?

   e. Once again, what do curly arrows represent in organic chemistry?

2. 10.5.2 Explain the substitution reactions of halogenoalkanes with sodium hydroxide in terms of SN1 and SN2 mechanisms. (3)
   a. Complete this general table for the reaction of halogenalkanes with alcohol containing compounds

	Number of Steps	**Order of Reaction**	**Type of Reaction**	**In general, what happens?**
Primary				
Secondary				
Tertiary				

   b. Primary Halogenalkane Substitution (S_N2)
      i. Provide the general equation for the reaction of a primary halogenalkane:

      ii. Explain the kinetics of this reaction:

      iii. Illustrate the mechanism for the substitution of and OH group on a primary halogenalkane:

   c. Describe the steric hinderance effect of a tertiary halogenalkane and why it prevents the S_N2 mechanism of a primary halogenalkane:

d. Describe the stability of the cations of halogenalkanes (primary, secondary, and tertiary) and the significance of the stability of the tertiary carbocation:

e. Tertiary Halogenalkane Substitution (S_N1)
   i. Provide the general equation for the reaction of a tertiary halogenalkane:

   ii. Explain the kinetics of this reaction:

   iii. Illustrate the mechanism for the substitution of and OH group on a tertiary halogenalkane:

   iv. Explain the trend in reactivity of halogens in this particular reaction:

3. 10.6.1 Deduce reaction pathways given the starting materials and the product. (3)
   a. Provide a flow chart for the various reaction pathways below, noting necessary reactants, conditions, and catalysts for the reaction to occur: